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The Value of Statistics in Public Health Work

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Read at Sixth Annual Congress Canadian Public Health Association, Ottawa, 27th September, 1917.

PUBLICITY is the prescribed modern cure for many evils. Hygienically speaking, much of the success attendant upon the persistent fight against disease is attributable indirectly to the light thrown upon health conditions in a community by compiled statistics, showing what diseases are prevalent, in what localities they occur, what seasons of the year favour their spread, and so on. A more intensive research into the localities and conditions brought into prominence by such compilations disclosed more minute and definite information, ultimately leading to valuable discoveries in some instances. The information thereby obtained is the foundation upon which the money is made available for dealing with the conditions which the statistics show to exist.

Even in the early stages of public health activities, the utility and serviceability of health statistics are noticeable. This would be exemplified in the history of small-pox vaccination. It was by keen observation of carefully compiled figures, searching scrutiny, and an arithmetical process of elimination and calculation, that Doctor Jenner:—

1. Derived his inspiration; for it was by taking note of the remarkable immunity of milk-maids who had previously contracted "cow-pox" that he was led to make a study of inoculation.

2. Convinced the public and the authorities of the efficiency of inoculation. Without the quotation of convincing evidence of figures proving the unmistakable effect of the vaccine, Jenner's great discovery would have been stifled by the opposition of violent unbelievers and hostile sceptics. He was first able to convince the medical profession and the state authorities by practical tests on individual cases; this gave the first impetus to the practice of vaccination. But convincing the public in general was left to the obvious evidence much later on, provided by the compilations of statistics showing the vast decrease in mortality and morbidity since the inauguration of vaccination. It took quite a number of years to foster the sympathy of the majority in carrying into effect universal vaccination. Later on it was possible to produce tables showing:—

1. The death and case rate in a country before and after vaccination.

2. Comparison contemporarily of the small-pox figures of two countries, one enforcing, the other neglecting vaccination.

In both cases the figures left no doubt in the minds of any unbiassed student of the subject that vaccination was all that

it claimed to be. But it is worthy of note that the adoption of the now widespread use of vaccine is attributable to the education of the public by the continual dissemination of figures, clearly proving the beneficial effects of vaccination. Some of the figures are well worth quoting here:—

In the Russian Empire there were two-hundred-and-seventy-five-thousand, five-hundred-and-two deaths from small-pox between 1893 and 1898. Vaccination was not obligatory. During the same years in Germany, where vaccination was compulsory, there were only two-hundred-and-eighty-seven deaths. This is an argument by comparing two countries contemporaneously. An instance of comparison of figures before and after the institution of vaccination is equally convincing. In Sweden from 1782 to 1821 there were two-thousand, two-hundred and nineteen deaths from small-pox, that is, in pre-vaccination days. In the same country, from 1813 to 1821, after the adoption of vaccination, there were only one hundred and thirty-three deaths. The transformation is too remarkable to be a coincidence. Such and other similar evidence adduced by statistics served to swell the ranks of Dr. Jenner's disciples. No great truth was ever promulgated but that there were found a host of objectors and murmurers who tried to stem the tide of progress. So with Jenner's great discovery. But time has told a tale. The anti-vaccinationists have dwindled to a merely negligible quantity. The education of the public, their enlightenment, and their final conviction and sympathy with the movement were rendered possible to a very large extent indeed, through the instrumentality of the persistent and continued dissemination of irrefutable figures and tables, compiled to show the unmistakable powers of vaccination as an eradicator of, and an immunizer against, one of the most prolific and pestiferous enemies of the health of any nation. Statistics are compiled for our enlightenment and guidance, and they constitute a far more reliable "steering gear" than all the idle ravings and pernicious doctrine of such mischievous misanthropists as the anti-vaccinationists. A movement to impede or undo the work of Jenner, which statistical records have again and again demonstrated to be not merely progress, but a "signal victory," would be a process similar to "putting the clock back."

Generally speaking, statistics have been responsible indirectly during the last century for the passing of much valuable health legislation. For it is only by the conclusions drawn from the annual figures that the students of hygiene have been able to ascertain the real sources of danger to the nation's health, the probable causes of danger in many cases, prescribes the remedies, and watch the results. Inasmuch as the general good health of any community is its very best asset, it is incumbent upon the country to inaugurate such measures as seem to its citizens to be necessary to prevent the invasion of disease. So we find the health of all progressive countries protected by health laws. In the administration of these laws statistics are also of incalculable value to the Health Officers. It is only by the possession of exact and precise information as to health conditions in a community that the health officer can regulate his activities and efforts in a way that will lead to the maximum of results. One valuable medium by which perhaps the most important, next to the birth figures, health statistics are compiled is the compulsory reporting of infectious diseases. The general dissemination of knowledge upon all matters, the laity require in order to appreciate the operation of and necessity of public health administration is rapidly converting them to approval of measures formerly misunderstood and sometimes resisted. Hence, reporting is becoming a less disagreeable duty to the physician. Reporting infectious diseases aims at two objects, the first being the protection of the public, and the second the collection of vital statistics. The first object is the more immediate one, yet it is to be feared physicians do not fully appreciate the value of the second one. Disease should be made a subject of common knowledge to the end that precautionary measures may be early instituted of such a character as will afford the *maximum of protection with the minimum of inconvenience*. To accomplish this, organization is essential and boards of health a necessity. To be effective, they must be vested with legal authority. Vital statis-

tics are impossible without professional reports giving the data necessary to the making up of the mortality rate and the number and character of infectious cases. But reports accomplish more than this; that is to say, the presence, in a more or less continued way or endemically, of communicable diseases is prima facie evidence of unpardonable supineness or even lack of intelligence upon the part of some one. Provided physicians make proper and prompt reports, the fault cannot be theirs, but rather that of the community or of its authorities. Eternal vigilence is the price of sanitary success. Vital statistics suggested the reforms in camp life during the Spanish-American War, and other wars, including the Great European War. These reforms are just as necessary in civil affairs, for the city is but a permanent camp. Indeed, the intelligence of a community can be somewhat gauged by its care or lack of care in the collection of vital statistics.

Urgency of Immediate Reports in Infectious Cases.

While the usual reports are always desirable, especial urgency occurs in the case of outbreaks of small-pox, cholera and other rapidly disseminated infections. Many infections have resulted from tardy reports, and it is essential that the telephone and telegraph be used, and they are none too rapid for reports in urgent cases or in those of marked danger.

Other Utilitarian and Practical Uses of Statistics are:

1. They afford a reliable means of indicating the results, favourable or unfavourable, of schemes or movements launched to combat the spread of infectious diseases, as, for example, the use of anti-typhoid vaccine, small-pox vaccine, or diphtheria antitoxin. The annual report forms the "sea-man's chart" of the Medical Health Officer, by reference to which he can with confidence and hope steer his ship without feeling that he is "groping in the dark," as indeed he would be otherwise. A short review of the typhoid fever history of the last few years will serve to illustrate the utility of the statistics in coping with the spread of the disease. In 1909 it became evident from the typhoid fever returns that there were unusual conditions prevalent in some parts, and particularly in urban districts, which were responsible for the increased spread of the disease.. Now it is an established fact that two factors play an important part in the cause of typhoid fever. (1) Water supplies, and (2) sewage disposal. It has been demonstrated that where the water is unprotected, and the human excreta not satisfactorily disposed of, typhoid fever invariably breaks out.

In 1909 report the Bureau of Public Health of the Province of Saskatchewan pointed out the danger arising from the neglect of sewage disposal, and outlined a method of improving the domestic sanitary arrangements, especially that "cities should do away with backyard closets and that connection with sewers should be made obligatory." "That not only should cities see that they have a by-law to carry this into effect, but that they should also give every possible assistance to their Medical Health Officers and their departments to enforce such a by-law." This advice has been carried out in some instances with a marked success so far as the reduction of the number of cases is concerned, for the 1910 returns show a decrease of 244 cases as compared with the previous year, the figures being, 1909 831 cases, 1910 587 cases. The number of deaths in 1910 was considerably larger than the previous year, however, in spite of the decrease in cases. Thus, 1909, 95 deaths; 1910, 151 deaths. The bureau accordingly, in the 1910 report, again impresses upon the authorities the urgency of improving the sanitary standard of the areas they are responsible for. The number of cases for the next two years were comparatively smaller; 1911, 453, and 1912, 548. The reduction in 1912 was even more real than it at first seems, for the population had increased from 490,000 in 1911 to 600,000 in 1912. The report for 1913, however, shows typhoid again on the ascendancy, due in a large measure to the rapid growth of some cities and towns, necessitated by the great influx of immigrants from all quarters, and overcrowding, and the consequent neglect of sanitary regulations that generally accompanies "mushroom-growth". Of the 1101 cases reported, which is the climax, 540 oc-

curred in cities, and of these 223 occurred in Regina. This state of affairs indicated that additional precautions were necessary to cope with typhoid fever. The free use of anti-typhoid vaccine was advised throughout the province as a preventive measure. The rapid decline in the number of cases since then is highly convincing of the efficacy of free distribution of anti-typhoid vaccine. Thus:—In 1913 there were 117 deaths from typhoid; in 1916 there were 61; there has been, therefore, a drop in the death rate per 100,000 population from 15.6 in 1913 to 8.5 in 1916. Looking further afield: The figures of typhoid in Winnipeg, the mother-city of the west, show a remarkable improvement in five years. Thus:—

	Typhoid 1912.		1915.
Winnipeg	13.2	(per 100,000 population)	3.5

Perhaps the most remarkable figures are those of some of the large cities in the United States. The progress in the fight against typhoid as depicted in the table below is phenomenal:—

TYPHOID. TEN YEARS' PROGRESS.

	Rate per 100,000 1906-1910.	1916.
Seattle	25.2	2.5
Chicago	15.8	5.4
Boston	16.0	5.5
Los Angeles	19.0	5.5
New York	13.5	6.0
San Francisco	27.3	9.4

These figures show the results that have been accomplished by the proper disposal of sewage, protection of the water supply, and the education of the public as to the means by which typhoid is principally spread, namely by direct infection and by flies. It must also be borne in mind that without the possession of the telling figures of typhoid in cities, sufficient evidence could not have been adduced to convince the authorities of the danger arising from sewage and infected water, and consequently it would have been difficult to persuade them to invest a large amount of capital in installing these plants.

The history of diphtheria in Saskatchewan also affords an interesting example of the valuable assistance given in controlling the disease through taking advantage of the light thrown on health conditions by the annual report. The use of antitoxin was always encouraged and enjoined, the value of its properties expounded in the press and in public addresses, but the universal use of it was by no means easy to ensure, as the figures below indicate:

1914—602 cases.	44 deaths.	7.30 per 1000 cases.	
1915—449 "	29 "	6.45	"
1916—275 "	44 "	15.92	"

An examination of these figures reveals that, while the number of cases in 1916 has fallen from 449 to 276, the corresponding number of deaths to these figures has increased; that is, while the antitoxin has been used successfully for preventive purposes, the application of it for curative purposes was not resorted to either soon enough, or in sufficiently large quantities to be effective. A more intensive scrutiny further shows that the disease was far more deadly in rural districts than in urban. Thus:

	Death rate per 1000 cases in rural munics.	in cities.
1914	71.-	30.9
1915	258.2	33.5
1916	159.2	55.0

This may be attributed to the difficulties of obtaining adequate medical attendance in the outlying districts, and consequently the delay or non-use of antitoxin in sufficiently large doses.

Moreover, the price of antitoxin (previous to its manufacture in Toronto University) was almost prohibitive. This is well illustrated by the charge of $12.50 made for ten thousand units of antitoxin by some of the druggists in the Province of Saskatchewan. As a result of the conditions revealed by the annual reports, the Government, at the suggestion of the commissioner, have from the 1st of September this year, been supplying diphtheria antitoxin to all physicians and hospitals throughout the Province free of charge. This will, it is hoped, assist in materially reducing the death rate from this preventable disease. There should be no case from now on that fails to be treated with the right amount of

antitoxin, and at the right time, and that too, without expense to the patient and without risk of financial loss to the doctor. It will be interesting to study the figures of diptheria after this regulation has been in force for a full year, in order to ascertain what material difference free antitoxin will be made in the elimination of the disease.

2. The Birth Figures and Infant Mortality Tables Are of Inestimable Assistance in Promoting Infant Welfare.

Infant mortality is one of the greatest public health problems of today. Until recently it was imperfectly understood, attacked only piece-meal, organized efforts being largely those of private philanthropy; but such an attitude on the part of health authorities can no longer be justified. One great statistician has remarked: "The infant death rate measures the intelligence, health and right living of fathers and mothers, the standard of morals and sanitation of communities and governments, the efficiency of physicians, nurses, health officers, and education." A feature that strikes the student of infant statistics at once is the remarkable number of deaths under one week and under one year. Thus in Saskatchewan in 1916, out of 18,958 children born, 1470 died, under one year of age. The figures and tables in the case of children can be put to highly practical uses. A close scrutiny reveals that of the groups of diseases under which the causes of deaths are classified, some can be definitely labelled as *preventable* and "due to neglect." For instance:—(1) *Communicable diseases.* It is not commonly realized how large a toll is exacted by the so-called minor preventable diseases of childhood, chiefly *measles and whooping-cough.* The figures for Saskatchewan for the last two years are a revelation of the indifference with which these children's diseases are treated. Thus:

MEASLES.

	Cases.	Deaths.
1915	1,293	5
1916	4,419	105

WHOOPING COUGH.

1915	339	41
1916	1,092	93

Protection from infection would obviate the contracting of these diseases, as well as scarlet fever, diphtheria and influenza.

(2) Tuberculosis. About one-quarter to one-half of all cases of tuberculosis in children under five years of age, as revealed in the statistics, are associated with the bovine type, that is, infection is due in these cases, and is traceable to, the consumption of infected cow's milk, the cow being an animal highly susceptible to tuberculosis.

The safeguarding, especially by pasteurization, would prevent much of the tuberculosis in children.

3. Congenital Malformation and Debility.

While many of the deaths under these groups are due to inherited conditions not susceptible of control through public hygiene, many of them could be avoided through pre-natal care of the mother and others by care after birth. In conclusion it may be said that of these deaths under one year (of which the Census Bureau estimates that the loss in 1912 was about 300,000 in the United States), at least half would now be living had we, as individuals and communities, applied those measures of hygiene and sanitation which are known and available.

There is a general movement in the direction of reducing the infant mortality rate, not only in the Dominion and the United States, but throughout the Empire; the public is waking up to the truth of the poet's dictum that "the child is father of the man."

An eminent health specialist and statistician has suggested the following means of utilising the vital statistics as likely to lead ultimately to a satisfactory reduction of all the avoidable deaths among infants.

A general survey of the situation should be made. This will involve a study of the statistics of infant mortality and a consideration of the available means for meeting the situation disclosed. All deaths of infants under two years of age should be tabulated and studied for two or more years back. They should be plotted on a spot map so as to bring out their topographical distribution, and thus indicate the particular districts in which work is most needed. They should also be studied by age and by causes, by color and nationality of parents, so that the health officer

may have a thorough familiarity with the problem to be attacked. Later on, after work is organized, intensive studies of selected districts, pertaining to morbidity as well as mortality, should be made, so that further knowledge of underlying causes may be gained. Accurate infant mortality figures require as a basis not only good death records but also complete and accurate registration of births.

The result of one campaign of investigation in Boston disclosed the conclusion that "breast-feeding of all babies would have saved nearly a thousand lives in 1911, and the death rate per 1,000 would have been 71 instead of 127. The work of Levy in Richmond, Hastings in Toronto, and Douglas in Winnipeg clearly show what can be done in the reduction of infant mortality by systematic scientific work, based on the book-keeping of statistics.

Instruction of the Public By Use of Statistics.

Statistics are only half a report. Their significance must be brought out by discussion, by criticism, and interpretation. The figures alone would not attract much attention from the ordinary individual, and, even if perused, the average person would not be capable of appreciating the fall, or deploring the rise, in the various death percentages, would not, in fact, be interested to notice the figures in other years, or of other countries or other provinces or cities.

The inductions and deductions must be made for the public, and the salient features of the statistics expressed in a clear and digestible form, lucid in style and meaning, in order to impress the average individual. This can be done in the annual report; true; but how many of the public ever take the trouble to read or even procure a copy of the "blue book"? In order that the people may reap the full benefit of the fruit of compilations, the inferences drawn from the figures must be brought to their notice orally, if possible, in the form of public lectures, or by pamphlets or bulletins, provided they are brief and explicit and inviting in appearance; the ordinary run of mankind will not trouble to look at a long, prosy diatribe thrust under their door, or sent them in the mail. People rebel against oratory that is "above their heads". And yet any professional man, each in his own sphere, may unconsciously fall into this habit, and, though his address or his editorial may be the most eloquent, most intensive, and most comprehensive, yet it may be all wasted, if the uninitiated audience have not sufficient specific knowledge of the subject to appreciate the speaker's or the writer's remarks. "Simplicity is the soul of a speech" is an old piece of oratorical advice, the adoption of which has enabled many a speaker to hold large audiences enthralled and spellbound.

Objects of Publicity.

All hygienic education of any kind has as its object one or both of two things, the improvement of personal hygiene, and the support of the administration of public hygiene. It has been found that among the general public there are vast numbers of people (even among those otherwise well-informed), who are ignorant of many of the simplest sanitary principles. If such principles were inculcated by the ready means of publicity, not only would the people benefit directly, but health work would gain a much-needed co-operation in its public measures. The rate of progress of public health work is determined by public permission.

Much the same practical principles apply to all publicity work, whether it be that of the commercial advertiser, of the journalist, or of the health officer seeking to instruct his public. The three main objects are:—(1). To gain effective attention, (2) to impress, and (3) to produce a desire to act or avoid. In preparing bulletins these principles should be borne in mind. Emphasis should be laid upon matters within the comprehension of the average citizen, and in which his co-operation is feasible, rather than upon tables of statistics. A mistake has been made in some instances of printing detailed tables of vital statistics and other matters of permanent record, but not of popular interest, in space which might much more profitably have been utilized in printing simple and interesting instructive matter.

Another thing that may be done, more easily and with good effect, is to reprint those portions of the annual health report which are of special interest to the public; for example, the sections giving the ratings

of milk dealers, dealing with special problems in which the co-operation of the public is desired. Inasmuch as much of a thorough annual report is by no means of popular interest and would be wasted upon any but the most intelligent citizens, the value of the popular reprint is manifest. Pamphlets also dealing with the regulations, and general information concerning communicable diseases with mention of what has been, and can be still, accomplished to eliminate them, have proved in several places, of value, and there is a large proportion of intelligent citizens who profit by such literature and encourage the issuance of it.

Medical Supervision of School Children

By Dr. H. A. Payzant
M.H.O., Dartmouth, N.S.

Read at the Annual Meeting of the Association of Medical Health Officers of Nova Scotia, July 3, 1917.

THE subject of the medical supervision of school children should at the present time be viewed with the great interest its importance demands. The battlefields of France are taking very heavy toll of the male youth of our country. These have been picked out for service at the front on account of their physical fitness, leaving behind those of more or less inferior physique to be the fathers of a future generation. This is a serious matter for our consideration as guardians of the public health. What are we going to do to meet this condition of affairs? It behooves us to be up and doing, to take stock of the health of our present school children, and get fully organized to supervise the health of the future generation, who may not inherit the same physical equipment as those at present under our charge. During this war the world has been standing still in regard to the progress of civilization. The ploughshare and pruning hooks of social and economic advancement have retrograded into machine guns and cannon, resulting in the stilling forever of the activities of the brains of some of the brightest men of the world. The mental abilities of the world have turned to the question how best to make men die instead of how best to conserve the health of the living.

Out of this great turmoil and confusion the scattered remnants will again take up the progress of civilization. Each country then will strive to conquer by the arts of peace. The children now attending our schools will be the men and women to take up the banner of civilization and enter the war of industrial and social expansion. The people who have awakened to the value of conservation of the health of our school children will be more ready to enter this fight successfully.

In order that the acquiremet of knowledge and the training of the brain may be accomplished under the best of conditions a system of the most rigid medical school inspection should be inaugurated in this Empire, this Dominion, and, what most vitally concerns us, this Province of ours. It is equally important that those who toil in the field, factory and other industrial concerns should be as sound in wind and limb as those who do mental work. As in the garden we carefully watch over early shoots and train the delicate tendrils, removing choking weeds and noxious insects until we have the hardy plant ready to brave heat and drought of summer and take up and successfully perform its mission in the world, so in the school we have the golden opportunity of watching these human plants, removing those influences and surroundings that stunt the growth of the body and nullify the efforts of our educational department. Surely this is worth while, and worth the expenditure of a great deal of effort and money on the part of the country.

The first thing that impresses the medi-

cal inspector in making the first inspection of a school—I know it impressed me—is the alarming number of those defective in one way or another in our schools. Most of these defects would never be recognized and connected if it were not for medical inspection. How can we ever expect to get the best results from our educational system if our children are handicapped by such defects? A child with a perfect health record is hard to find. The results of my first examination of Dartmouth school children is as follows:—

Children inspected	1170
Females	586
Males	584
White	1146
Colored	24
Defective	1024
Vaccinated	213
Not vaccinated	957
Defective vision	146
Defective hearing	64
Glands	2
Adenoids	121
Tonsils	207
Defective heart	10
Defective teeth	994

I presume this is not any worse than other places in our Province.

The first thing of importance in the supervision of school children is to see that their surroundings are right. The age of the log school house and its unworthy successors is past. Some of our greatest men came from these, but how about the ninety-nine whose feeble flame went out on account of a carbon dioxide narcosis? Was this not a case of the survival of the fittest? A great many of these schools have served their time and because of their age, have to be replaced. Now is the time to see that they are replaced by modern and sanitary buildings.

The school should be free from dust, and supplied with plenty of fresh air without draughts. A very important thing is the lighting system. Windows of large size should be placed so that the writing on the blackboards should be seen without any effort on the part of the child. This has been a great fault with older schools, and has no doubt been responsible for eye strain and its effects. The seats and their relations to the desks should be such as to maintain an upright and easy posture, giving the lungs a chance to get their full supply of air. Drinking fountains, with water purling up like a roadside spring, should be provided, doing away with the risk of contagion through drinking cups. Up-to-date sanitary plumbing should be installed and kept clean, and in good running order. The school should be in a quiet neighborhood, and away from the smoke and noise of factories. If the older schools have to still do duty through financial stress, with a little expense they could be made somewhat better by enlarging windows and providing better ventilation. The next thing is to inspect the child and see what can be done to fit him to take advantage of his opportunities.

In the medical inspection of children the gaining of their confidence is of prime importance. If they feel like a galley slave, scoured to his dungeon, or a criminal haled to the bar of justice, we are not likely to make much progress. A frightened child does not yield much information, and sounds proceeding from the examination room savour rather of the Spanish inquisition. It is best, therefore, to begin with older children, and several in the room at a time. This gives them confidence and better results are obtained. It gradually filters down to the smaller ones that the medical inspector is not to be feared. A smile and a joke will do much to put one on a friendly footing.

Where we have such a large number of children as we have in our town and city schools, the time spent on each one has to be very limited. Some regular routine has then to be considered in order to get through in the time allotted. Here the school nurse is of very material assistance to us. She arranges the dress for examination and does the clerical work. Printed cards are used to preserve the record of each child from year to year. In this way we can see what progress the child is making, and if our recommendations are being carried out a rapid survey of the child will show the general physical make up, noting nutrition, mouth breathing (indicating adenoids, presence of pediculi, anaemia, enlarged glands, etc). The mouth being opened, number of decayed teeth, color of gums, the presence of enlarged tonsils,

cleft palate, scars on tongue, are noted. The ears are tested with watch, and any departure from normal estimated; also the presence of a discharge. The lungs and heart are next gone over, but owing to lack of time our records here are not as complete as they should be. The eyes are then tested with the ordinary test types for defective vision, at the same time noting diseases of eyelids and eye itself.

The different defects are noted down on the card according to degree of departure from normal by placing No. 1, 2 or 3 in the spaces opposite, indicating good, slight, very bad.

The nurse calls at the homes of these children and explains to the parents or guardian what we have found wrong, and advises seeing the family physician,, specialist or dentist, as indicated. She also reports on the home surroundings and offers any suggestions that she can in regard to the welfare of the child. A tactful nurse can do much good in this way, and is very seldom resented.

This is a very rough outline of what can be done by the inspector when he has such a very short time to devote to the examination of each child. This, however, is a good beginning in the right direction, and of course in some places is much more extended. As the public are educated to see the great value of school inspection and are willing to devote more money to it, its usefulness will be very much enlarged and be of great benefit to the community.

A special room in each town, city or district could be devoted to school inspection, where weight, height and chest measurement could be taken, and those feeling below certain standards could be followed up through the term.

In the future the physical progress of the child will be regarded as of equal importance to its intellectual attainments, for of what use is a storehouse of knowledge with the edifice in a weakened condition, unable to make use of it? These defects having been discovered and noted, the ultimate object of medical inspection should be the removal of all obstructions to mental and physical growth. These can be detected at an early age before their deleterious influence have had a chance to undermine the constitution. It is in the primary department that our best work can be done. Here the pathological condition can be met with when in a generally curable stage, and the child from the very outset of its educational career has all of its physical impediments possible removed. Is not this of great value to the state?

The physical well being of the child should be the primary consideration in our educational system, for upon that depends the ability to absorb knowledge and retain it for the use, benefit and upbuilding of our country.

Unfortunately the correction of some of these conditions is financially impossible for the poorer class. The correction of eye conditions by the use of glasses and the filling of decayed teeth are often beyond the means of many. Removal of tonsils and adenoids are expensive operations. These conditions form a large proportion of defects in our schools and are probably the most serious in their efforts on the acquirement of knowledge as well as the future health of the individual. Here is where the state should come in and provide means for those unable to pay for these things. This surely would pay large dividends to the state in the added efficiency of a healthy population.

This question, of course, is solved in the larger centres by free clinics, but in smaller places there is some need of help in this direction. The scope of school inspection is capable of great expansion. The food and exercise could be supervised. Open air schools for those with a tendency to tuberculosis would be of great benefit Something could be done for the backward and mentally defective in having them in special departments.

Medical supervision is at present almost confined to the cities and larger towns of the Province. In order to be thoroughly effective this must be extended until every village and hamlet shall have this great advantage. It is, therefore, our duty as health officers of this Province, to use every effort to educate public opinion in this direction so that this invigorating climate of ours should be able to enter upon life's struggle unhampered by the results of easily removed impedimentae, ready in health and efficiency, each to do his share in placing our Province in the forefront of social and economic progress.

Some Medico - Sociological Problems Arising Out of the War : :

By W. H. Hattie, M.D.
Provincial Health Officer, Halifax, N.S.

Read at Sixth Annual Congress Canadian Public Health Association, Ottawa, 27th September, 1917.

ACCORDING to "The Passing Show" of a recent date, the officer said: "That's a pretty awkward lot you have now, sergeant;" and the sorely tried sergeant-instructor replied: "That they are, sir. It's the like of them, sir, that brings 'ome to us what a 'orrible thing this war is, sir."

Now there's many a true word spoken in jest, and even though this may have been intended as a joke, it has a serious side. The average drill instructor is not only singularly facile in picturesue expression, but his words go as his bullets should —straight and true to the mark. The sergeant has given voice to an actual fact. In comparison with the men who marched away in the earlier stages of the war, it must be obvious to everyone that these recently enlisting average but poorly in physique, in alertness and in military adaptiveness. There has been great depletion of our most capable men, and we are in very truth but beginning to appreciate "what a 'orrible thing this war is."

It would be quite inconceivable that a war of such exceeding magnitude should not create a large variety of problems having a more or less direct bearing upon the health and efficiency of our people. All these problems doubtless have a bearing upon our physical well being, however indirect it may be. Many are in essence medico-sciological, and it is to some only of such problems that your attention is now asked.

Most apalling and most appealing of all the aspects in which the war affects us, is of course, the frightful toll of life. Out of the very best of the manhood of the world, millions have rendered the supreme sacrifice in some martial service. Some day we may have tolerably accurate figures relative to these losses, but we will never be fully informed as to the number of civilian lives which have been blotted out in consequence of the dangers and distresses to which con-combatants have been and are being subjected. The suffering thus caused is immediate, and falls upon us. But what is to be the effect upon future generations? The men who have gone to the front are those who, in theory at least, were best fitted to father a vigorous and virile generation—a generation which might flourish despite unfavourable conditions of environment. The loss by death and disablement must almost inevitably have an effect upon the birth rate, and upon the stock-quality of the next generation. The labours of world reconstruction must then devolve upon a depleted population, handicapped by a relatively weak progenitorship. It would be easy to make alarmist predictions in the face of such possibilities, but this is no time for pessimistic prognostications. We must look forward in the same spirit of determination and of readiness to do our bit which characterizes our lads in the battle line. Unrestrained but well directed efforts must be made to discover and apply these measures which will best counteract the disabilities with which we must contend, so that our supremacy may be in no way impaired or even threatened.

In some respects, at least, the war has thus far not had so prejudicial an effect as we once feared, even before a full appreciation of its stupendousness had been forced upon us. It is, perhaps, too soon to state assuredly that these early fears may not yet be realized, but with the advantage of a better perspective, and under compulsion to be more seriously attentive to the problems which we must solve, than in those days of relative light-heartedness, we may feel reasonably confident that many of our first apprehensions will never become really portentious

In view of the human wastage being occasioned by the war, it is but natural that we should take an exceptional interest in the birth rate. This, as is well known, has been the occasion of much anxiety in Euro-

pean countries for several years. While the effect of the war upon the birth rate of enemy countries must, with us, be rather a matter of speculation, a number of seemingly authoritative returns indicate that there has been a marked falling off in the number of births in those countries. In Bavaria, the birth rate for 1915 is given as nearly 24 per cent. less than that for 1913. In Berlin the falling off amounted to 20 per cent, and in Vienna to 26 per cent., while the mean falling off in ten enemy cities (including Berlin and Vienna), was 27 per cent. So seriously is the situation regarded in Germany that we read in one of Carl W. Ackerman's articles that a leading physician and alderman of Berlin, one Dr. Engel, publicly argues in favour of a kindlier consideration of illegitimacy, although one would not have thought, judging from the statistics of other years, that the German people have ever been keenly meticulous in their attitude in this matter. Ackerman asserts that the German Government now actually encourages illegitimacy, although necessarily by indirect means, and he quotes Dr. Engel as stating that the number of illegitimate children born in cities such as Berlin, Hamburg and Munich has increased from 15 per cent. in 1914 to 45 per cent. in 1916. Such an increase in illegitimacy in the face of a marked reduced birth rate is surely a problem fraught with future possibilities.

British figures offer an interesting and encouraging contrast. Here, too, there is a falling off in the birth rate, but it is very little greater than what might be termed the normal decline of the past decade or longer, amounting for England and Wales (comparing 1915 with 1913), to less than 8 per cent. The mean of nine British cities shows a decline of about 9 per cent. On the other hand, the illegitimate birth rate (1915), in England and Wales, while, in proportion to the total number of births, slightly higher than for several years preceding, is, when estimated on the number of unmarried and widowed women between the ages of 15 and 45, the lowest on record.

Our Canadian figures are, of course, of peculiar interest to us. For several years there has been a gradually increasing birth rate in all our provinces with the exception of Quebec, and possibly also of New Brunswick, which does not publish its vital statistics. As far as I have been able to secure these figures, this tendency has not been adversely affected by the war. In respect to illegitimacy in Canada, returns are not available for all the Provinces, but in Nova Scotia, Ontario and Saskatchewan, which publish statistics on this point, the figures are quite as creditable as they were in normal times.

In intimate association with the question of the birth rate, there naturally falls the infantile death rate. As far as enemy countries are concerned, we are again somewhat in the dark. Statistics would indicate improvement in certain communities, but many of the reports which have come to us from those in a position to formulate approximately accurate opinions, and who would have no good reason for misrepresenting conditions, indicate that there has really been a definite increase in the mortality amongst infants in these countries. In England the rate has been rapidly improving for some years. In 1915 it was 110; in 1916 it was 91—the lowest on record. In 1916 London brought its rate down to 89—a veritable triumph. In Scotland the rate for 1916 was 97—again the lowest on record. And in practically every Canadian Province we have been steadily bettering our returns in this particular, and have had no set-back in consequence of the war.

It would seem, therefore, that in these important particulars at least, Canada and the Motherland have thus far suffered little in comparison with enemy countries. This gives us an initial advantage, the value of which can scarcely be overestimated, but which, of course, is in relation more particularly to enemy countries. Some of our allies, with whom we must ever compete in the enterprises of manufacture, trade and commerce, will emerge from the war less strained than we will be. We must be fit to successfully meet such competition. Others of our allies, those who have had to endure devastation which no other age could have thought possible, must have our support and assistance for many a year after peace has been declared. And even in the redemption of the enemy countries it is quite possible we may be assigned a role. It is evident, therefore, that the future has so much for us to do that we can-

not afford to rest content merely because our present status in the particulars noted is better than that of our enemies.

A good deal of uneasiness has been caused by the impression that there has been an increase in crime and delinquency since the outbreak of the war. There is good reason to believe that this is true of enemy countries, and it is also true of the Motherland. In Britain, however, the increase in offences has been largely in those of a minor character, although very unfortunately the curve of juvenile delinquency, has risen sharply. While the removal of paternal restraint is the cause assigned for the major part of the increase in juvenile delinquency, stresses incident to or accentuated by the war, acting more or less directly upon the health of the individual, are accountable for a very considerable proportion of the offences. I have endeavored to obtain statistics with reference to the effect of the war upon juvenile delinquency in our Dominion. The methods of dealing with the neglected and dependent children, and of compiling statistics with reference to them, differ greatly in different Provinces, and I have failed to get satisfactory figures for all the Provinces. While some communities report a notable increase (Montreal 40 per cent.), it does not appear that this is generally applicable to the Dominion. The total number of convictions of juvenile criminals, according to the returns of the census and statistics office, was 3,050 for 1915 and 3,157 for 1916, as against 5,280 for 1914. But two superintendents have made the very important comment that there has been an increase in delinquency amongst mothers during the absence of the fathers on military service. This cannot but react unfavourably upon the children, and is, therefore, a matter for our careful consideration.

As for crime generally, in Canada at large, it is sufficient to say that while the convictions for indictable offences, and the convictions and sentences for all offences, increased rapidly in numbers from 1912 to 1914, substantial decreases are recorded for 1915, and still more substantial decreases for 1916.

A very interesting sidelight upon the question of war and crime is contained in a contribution to the London Daily Mail by Mr. Edwin Pugh, in which he refers to a recent official announcement that 7,000 out of 15,000 convicts and misdemeanants in the British Isles had been allowed to volunteer for military service. Out of the number 530 had been killed in action, 49 had died of wounds, 13 had died of sickness and 1,530 had been wounded. But the point of greatest significance is this: Three had received the V.C., 25 had been recommended for the D.C.M., 20 had been mentioned in dispatches, and eight had been given commissions. To so great an extent, therefore, the war may be regarded as a redemptive factor in the realm of criminology.

The effect of the war upon the mental stability of our people is another matter to which we naturally turn our attention. One might reasonably expect that the anxieties, deprivations and other stresses to which both soldiers and civilians are being subjected would lead to a notable increase of mental disorder, with all that that implies. From the old land, however, the information we receive is most encouraging. The superintendents of several prominent institutions for the insane report that thus far there has been little, if any, added incidence of insanity in the civilian population, and they in fact, anticipate that the greater variety of occupations now available to women by enabling them to obtain work for which they are best fitted, will increase their mental stability. Whilst there are many cases of mental disorder in soldiers, these are mostly of a recoverable nature. In Canada we have had a practically identical experience. Few of the superintendents of our institutions for the insane report any notable incidence in mental disorder which can be traced directly to the war, and the majority of cases which are so attributable have been in persons of unstable nervous organizations who would doubtless have broken down, sooner or later, under some other stress.

One of the most potent factors in the causation of mental and other diseases, degeneracy, poverty and crime has without doubt, been the abuse of alcohol. It is impossible to believe otherwise than that the sentiment in favour of restricting the manufacture and sale of intoxicants, which has been so greatly strengthened by the war, will increase rather than lessen after peace is declared, and it is a fair assump-

tion that we will, in consequence, have less insanity and other diseases attributable to alcohol, and less crime, in future, than we have had in the past. Perhaps nothing has developed out of the war of greater interest or greater significance than the unanimity of the leaders of the warring nations in declaring their recognition of the effect of alcoholism in reducing efficiency, or than the practically synchronous action of the various nations in adopting measures to mitigate the evil. This must be regarded as a medico-sociological matter of the greatest moment.

The terrible experience which our magnificent ally, France, is now facing in the matter of tuberculosis, must be given at least a brief reference. Dr. Hermann M. Biggs' report upon his investigation of tuberculosis in France is, of course, familiar to all of you. The remarkable contrast in the experiences of our own Motherland and of La Belle France in this particular must be regarded as conclusive proof of the efficiency of the anti-tuberculosis measures which have been carried on during late years in England, but which were so unfortunately neglected in France. We have reason to be profoundly grateful that England and the British Dominions had made an advance in dealing with tuberculosis which has stood them in so good stead at so critical a time, and we may feel sure that so remarkable a demonstration of the real value of anti-tuberculosis work will secure for it much more sympathy and support than it has had in the past. We have enlisted many tuberculous men, and they are now costing Canada from $1,200 to $1,300 a year each. This fact will impress upon our people the economic importance of tuberculosis control, and the part which ill health plays in producing military inefficiency will awake a fuller realization of its influence in lessening efficiency in the prosecution of the pursuits of peace times. We may hope, too, that the plan adopted by the Military Hospitals Commission in providing sanitorium treatment for tubercular soldiers may be but the beginning of a national system of control of tuberculosis, which would seem to be the most reasonable and most hopeful method of dealing with this disease.

The success which has attended the efforts put forth to control the communicable diseases, which in former wars worked such havoc amongst the troops, must give an impetus to public health work at home. It can scarcely be doubted that our soldiers will come home so impressed with the importance of sanitary measures that they will all be missionaries of our propaganda, while the unanimity with which the war correspondents endorse the merits of military sanitation will strengthen the confidence of our people in sanitary measures generally, and enable them to endure the restrictions which sanitarians sometimes impose with greater equanimity. This may be expected even in the case of the venereal diseases, which have heretofor proved so baffling a problem in public health work, but which have been shown by military experience to be amenable to a degree of control which, a few years ago, even the most optimistic would not have thought possible. The revelation of the astounding prevalence of venereal disease could scarcely have been made so effectively in peace times, and the war has given an unique opportunity for educational effort. It would be difficult to overestimate the medico-sociologic importance of this single factor in the progress of preventive medicine.

Then the addition to our knowledge of medical and surgical procedure, already so extensive, will be greatly increased as the result of the more deliberate study and research which will be possible after the war ends, and will place us in a much better position than we have been heretofore in our endeavors to cope with the various ills to which flesh is heir.

All these things give us encouragement to believe that the agonies of the war may fairly be regarded as the birth pains of a new development in preventive medicine —one which will have the popular support which is essential to success, and one which will prove the most potent factor in offsetting the most deplorable of the evils which the war has brought upon us. But we must not await the end of the war in our endeavor to work out our salvation. Just as we gave too little heed to the matters which were really of most material concern to us in the piping days which were ours before the fateful events which precipitated this horrible struggle, so even today we are sacrificing more of our people

to inglorious death through preventable diseases than are being lost to us in the far flung battle line. Moreover, we are faced with the most disconcerting fact that from 35 to 40 per cent. of those Canadians who volunteered their services in the great cause were either rejected at the time of application or were later found unfit for military service. Whether or no we may take this as an index of our disability in the struggle to secure and maintain a foremost place amongst the nations may be debatable, but it cannot be considered a satisfactory showing for a young and sometimes a boastful people, and must be regarded as a stirring call to more vigorous combat of the conditions which militate against efficiency.

And we must remember that the war has not been won; that there lies before us a long period of stress and strain, of denial and distress. There is reason to fear that the prosperity which we have been enjoying may not be long continued. There will still be demand for our men and for our products. This will lead to greater demand for the labour of our women and perhaps even of our children. We must be wise in dealing with matters of such great moment. Child labour at least must be most strenuously opposed. The recent statement of Mr. Prentiss Gray, Commissioner of Relief for Belgium, that, mainly in consequence of ill nourishment, the mortality in the industrial centres of Belgium and northern France has advanced from 15 per cent. to 65 per cent., must impress us with the need for doing more for our allies and also for ourselves. We must watch with meticulous care the effect of food control upon our own people. Baden-Powell's dictum that "nothing sharpens a man's ingenuity more effectively than an empty stomach" is not a good rally cry for the conservators of the health and efficiency of the people. A special effort must be made to see that our children and nursing mothers are abundantly nourished. At whatever cost we must save the kiddies.

Nor is it sufficient to limit our efforts to the reduction of infant mortality. Important as that is, it is not as important as judicious medical supervision of children throughout the years of their attendance at school. I am very strongly of the opinion that there is nothing in all the field of public health work which offers more reasonable prospect of profitable returns than well organized medical supervision and control of our school children, and feel that our Federal Government could render no more effective aid to preventive medicine than to organize such a system, in co-operation with the provincial authorities, and to provide such financial assistance as would make it applicable to every school in the Dominion. At this time, when it is so necessary to prepare our growing boys and girls to take on the unusual burdens which our war losses will necessitate them to assume, it is only by national organization that we may hope to attain the results which it is imperative we should have if we are to escape national disaster.

The effect which the war has had in withdrawing a large percentage of medical men from civilian practice, and in reducing the number of students in the medical colleges, is another matter which is not without medico-sociological bearing. There can be little doubt that the depletion of certain districts has already become sufficiently marked to occasion anxiety, and the need for medical men at the front continues. A difficult problem may present itself in this connection. The needs of the civilian population must be considered, but it is by no means so easy to allocate civilian practitioners to certain districts as is the case with medical officers of the army. It is not impossible that the necessity may arise for the State to interfere, and to prescribe areas in which physicians may practice. We must not cling too tenaciously to our ideals of democracy at a time which is so pregnant with peril, but before adopting so drastic a measure, an honest effort should be made to see what can be accomplished through co-operation of the military and civil authorities. Something might be done by assigning senior members of the profession to many of the home military duties which are now occupying much of the time of younger practitioners, and thus release a considerable body of the more physically fit of the profession for the more arduous fields of medical practice.

While the reduction in the number of medical students has thus far not been sufficient to cause real concern, there is a

chance that conscription may make this a matter of moment, unless due consideration is given to the medical needs of our communities in the selection of conscribed men.

That the present shortage in medical, and the prospective greater shortage, constitute an additional reason for the most vigorous prosecution of public health activities, would seem to require no argument. And others might be presented, almost *ad infinitum*. Never before has the need for aggressive public health activity been so great. The most effective way to offset the loss of life which the war is causing is to prevent needless death at home. The most effective way to offset the loss of property and of wealth is to make our people physically and mentally capable of meeting the enormous demands which the work of rehabilitation will force upon them. To accomplish such a task is the obvious and the patriotic duty of those engaged in the public health service.

Medical Aspects of the Tobacco Habit

By D. Fraser Harris, M.D., D.Sc., F.R.S.C.
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Read at the Annual Meeting of the Association of Medical Health Officers of Nova Scotia, July 3, 1917.

IN dealing with the subject two different considerations must be before us, first: the chemistry of the dried tobacco leaf, that is, of tobacco juice; and, secondly, the chemistry of tobacco smoke.

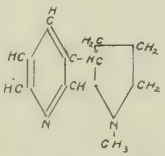
Clearly not everything in tobacco will be present in the smoke, and not everything in the smoke will enter the blood.

As everybody knows, tobacco may be burned, that is, smoked, or be chewed, or be taken up as snuff.

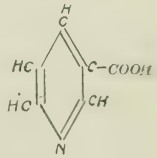
The dried tobacco leaf contains of nicotine from one to eight per cent., and at least three other alkaloids (Pictet and Rotschy, 1901).

Nicotine is a laevo-rotary alkaloid (C10 H14 N2), which is present in nature as the tartrate and the malate of nicotine.

Nicotine is a pyridine ring with a pryrrolidine ring as a side chain.



Tobacco smoke contains pyridine and furfural, a carbohydrate derivative. An oxidation, which must occur in burning, as for instance by potassium permanganate, nicotine splits up and yields pyridine-carboxylicacid and nicotinic acid (C5 H4 N. CO.OH).



Nicotine is a colourless liquid with the smell of tobacco. It is miscible with water and turns brown on exposure to the air. It forms salts with acids, for instance the tartrates and the malates.

Pictet has shown that in nature nicotine is lævorotary, but a dextro form is known. Pictet formed a synthetic nicotine, and from it separated the dextro salt as the tartrate. Curiously, the natural lævo-rotary nicotine is only one-half as poisonous as the artificial dextro-rotary sal.

Conine, the alkaloid of the hemlock, and atropine, that of Atropa Belladonna, both resemble nicotine in their poisonous effects; all three belonging to the Solonaceæ.

The substance called pyridine in tobacco smoke is probably nicotine acid.

The alkaloid nicotine is extremely poisonous; one thirty-second of a drop kills a rabbit. Four mgrms (1-10 of a drop) placed in the human stomach produced giddiness, deafness, sleeplessness, disturbance of breathing, clonic spasms of muscles; the symptoms lasted three days. Tobacco enemata have proved fatal.

Prof. Cushny gives the following as the symptoms of nicotine poisoning:—

Salivation, nausea and vomiting; sometimes purgation; respiration accelerated and laboured, with moist rales; pulse at first weak and slow, then weak and rapid. There is some mental confusion, giddiness, restlessness, atonia of muscles, loss of co-ordination and then complete loss of consciousness. A large dose kills outright by paralysis of the central nervous system.

Clearly the small, non-lethal dose is a toxic stimulant (irritant) to the medulla oblongata. Hence we have salivation from stimulation of the centres for salivation, perspiration from irritation of the perspiratory centre, and vomiting from irritation of the vomiting centre. The cold sweat and sickness of the first cigar are well remembered experiences.

The influence of nicotine, or at least of smoking, on the heart and blood-vessels is well known to medical men. We have to distinguish between the effects of the small initial dose, and of the habitual use of tobacco. After the first smoke the blood pressure falls; doubtless due to cardio-inhibition from irritation of the vagus nerve, and this explains the faintness and weakness characteristic of this condition. As we all know, this state of matters can be overcome by perseverance.

The two outstanding cardio-vascular effects of habitual smokers are: First, rapid, irregular heart (the tobacco heart), and, second, arterio-sclerosis. There is no doubt that prolonged, excessive tobacco smoking does lead to rapid and irregular heart action; irregular both in rate and force, for there is improvement on diminishing the allowance of tobacco. Sir William Osler is very emphatic about the damage done to the hearts of young recruits in the present war by the altogether excessive allowance of cigarettes consumed in the trenches. That tobacco smoking is a cause of arterio-sclerosis few physicians doubt, but the evidence for this is what would be called in the law courts "entirely circumstantial." For in clinical medicine we can rarely disentangle the co-operant activities of alcohol, tobacco, over-feeding and syphilis as contributing to arterio-sclerosis or atheroma. We all know that arterio-sclerosis is seen in men who have never had syphilis and do not overeat; who would not know a "church-warden" from a "hookah", and could not tell green Chartreuse from ginger ale. I believe nicotine as the sole poison can produce arterio-sclerosis; but that idiosyncracy plays a very large part in these cases. I believe there is the same tolerance or intolerance of tobacco in certain cases as there is of alcohol; men differ widely in this respect.

Experiments on the lower animals are not entirely conclusive. Infusion of tobacco has been injected into the veins of rabbits for a period of fifty days, and changes in the aeota were produced which closely resembled atheroma. Doses of only 1.5 mgrms, repeatedly injected into the veins of rabbits produced, only in some of the animals, calcification of the aorta. The blood pressure was, however, raised in all cases. Now we know that elevation of the blood pressure is a factor in producing arterio-sclerosis. Quite recently Mademoiselle Condratieff, at Petrograd, showed by direct fusion, that nicotine is a vaso-constrictor (Physiological Abstracts, April, 1917). But more than this; Huchard in 1889, and Sir William Osler quite recently asserted that angina pectoris and cardiac neuralgia can, in certain cases, be attributed to excessive smoking. Osler saw one case of a lady who smoked at least twenty-five cigarettes a day, and suffered every morning from precordial pains. Osler further believes that certain cases of sudden death in very heavy smokers are due to vagal cardiac inhibition, another evidence of the stimulation of the medulla oblongata. An Italian worker has lately shown the possibility of nicotine antagonising the effect of digitalis on the heart. If this observation is corroborated, the fact is an important one in connection with our prescribing digitalis to smokers.

The digestive functions are certainly influenced by excessive tobacco smoking. No physician doubts that in some men there

is a gastric hyperacidity due solely to the use of tobacco, which is known as hyperaciditas nicotinica. Naturally the gastric mucosa is the more seriously affected when to this acidity is added the chronic catarrh of alcoholism. Once again idiosyncracy plays its ever-to-be-remembered part; some heavy smokers do not have acidity, and some men who never smoke have acidity. It is just as with the arteries; some heavy smokers have atheroma, some have not; some men who never hold a pipe in their mouths die of apoplexy or of angina pectoris.

The effect of smoking on the respiratory tract is certainly not so serious as upon some of the other systems, but it must be taken for granted that tobacco smoke has an injurious action on the cilia of that tract. Doubtless this action is brought about more intensely by the practise of inhaling smoke, that is of drawing smoke well into the lungs, and either ejecting it through the nasal passages or more imperfectly through the mouth. Here the poisonous vapors are brought into direct contact with the cilia, and must devitalize them. Since the cilia have the important function of driving the mucus from the nose to the mouth and from the lungs to the mouth, it is quite possible that in bronchitis in smokers the useful attributes of the cilia are impaired much more than they would be in non-smokers. I need hardly allude to the glossitis and the pharmyngitis from the hot smoke, nor to buccal carcinoma due to the heat of the pipe-stem.

The influence of tobacco on certain nerves is very well known. The optic nerve is caused to degenerate in such a way that indistinct vision, known as tobacco amblyopia, is the result. No doubt alcohol again could participate, but a pure nicotine amblyopia is a certainty. But if the optic nerve can be injured by tobacco, it is highly probable that other nerves will not escape. Neuritis in an inveterate smoker should always make us remember the possibility that the tobacco itself, if not the chief, is an accessory factor in causing the neuritis.

The only other point of clinical interest that may be mentioned is that in carcinoma of the stomach, and also after influenza, the craving for tobacco is lost.

While I am not prepared to explain on the application of some one general principal all the various clinical symptoms of tobacco poisoning, I would lay before you some facts gleaned from the use of nicotine in the physiological laboratory. The most familiar action of nicotine, whether injected into the blood or painted over a nerve-ganglion, is to cause such an increase of resistance at neutral synapses that impulses are prevented from passing over these synapses (the Langley-Dickinson phenomenon).

Langley early showed that a very small dose of nicotine stimulates the cell instead of paralyzing the synapses, so that a transient vaso-constrictor effect is produced in the arteriole. To the stimulant (irritative) effect of a small dose are to be attributed such clinical signs as vomiting, perspiration and contraction of the cutaneous vessels. To this same action may be attributed the alleged improvement in mental operations done under the influence of tobacco (cf Berry, Psychological Bulletin, Princeton, 1917, Vol. 14. Effects of Smoking Cigars on Adding). The increase of resistance at synapses explains such phenomena as: (1) the rapid, feeble heart, by the cutting out of vagal cardio-inhibitory impulses, (2) the low blood pressure and collapse, (3) the mental confusion and final loss of consciousness. It is possible that the alleged sedative effects of tobacco smoking may be due to the slight increase of resistance at those synapses in the cortical centres, whose activity underlies consciousness.

The only other point of physiological interest I shall allude to is the alleged power of the liver to form an anti-toxin for nicotine. If the toxicity of a certain solution of nicotine be ascertained, and if the same strength of solution has been perfused several times through the surviving liver, then it is found that the toxicity of the nicotine is very much reduced. An extract of press-juice of living liver will effect the same thing, but a dead liver or a boiled extract will not do so. Prof. Dixon of Cambridge has, therefore, assumed that the thermolabile antibody is enzymic in character. This certainly explains the acquired tolerance of tobacco, and also why such tolerance is not indefinitely prolonged if for any reason smoking be given up and then resumed. The following illustrates this: The crew of a ship sailing between a port in America

and South Africa was becalmed and took six months for the voyage. Long before the end of the voyage the tobacco ran out; almost all of the men on resuming smoking on shore suffered from sickness just as though they were experiencing their first smoke.

I feel that I am a most unsuitable person to have been chosen to open the discussion on tobacco if I am to be called upon to explain why nearly everyone smokes tobacco and why, unfortunately, a large number of people also chew it. Sydney Smith once said that there were some people who would speak disrespectfully even of the Creator. If I were to give the reasons for the universality of smoking, I might find myself in a class similiar to the one alluded to by that witty clergyman.

Conclusions.

1. The substances in tobacco smoke which are injurious are probably oxidation products of nicotine and other alkaloids.

2. The smoking of tobacco is the more injurious the younger the person, hence young recruits suffer more readily from "tobacco heart" than older men.

3. The chewing of tobacco is much more injurious than the smoking of it, and ought to be discouraged.

4. Since what is injurious in tobacco smoke is absorbed more readily by inhaling than by smoking without inhaling, inhaling ought to be discouraged.

5. There is a marked idiosyncracy towards tobacco in respect of the substances which raise the blood-pressure, cause irregularity of the heart and give rise to gastric acidity.

6. Those who have this idiosyncracy ought not to use tobacco at all.

7. Those who do not have this idiosyncracy may use tobacco in moderation with impunity.

Observations on the Conservation of Life

By Dr. J. J. Cameron
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Read at the Annual Meeting of the Association of Medical Health Officers of Nova Scotia, July 3, 1917.

THE problem of the conservation of human life is so complex, so varied and comprehensive, that any observations I am able to make in this short paper will necessarily be incomplete. My purpose is merely to offer a few suggestions in a general way.

Out of the patient and devoted search after truth as embodied in the workings of the physical universe has grown the composite science of biology. Medicine is nothing more than the application of this science (together with the sciences of chemistry, physics and mechanics) for the prevention and cure of disease. Every medical man must be a biologist.

In the study of conservation several complex problems present themselves, as:

1. The comparative potentialities of the different races.
2. Heredity—its laws and consequence.
3. Prevention, and its significance.
4. Our duties in relation to ourselves and to our neighbors.
5. Environment as an influence in society and civilization.
6. Community and state efficiency in implementing the laws of health.

THE COMPARATIVE POTENTIALITIES OF THE DIFFERENT RACES

In comparing the different races we must, of course, deal with averages, and assume that the intervals or gradations of inequality is the same for all the races, i.e., that the interval between the sane and insane, for instance, is the same for all.

First, comparing the negro race with the Anglo-Saxon in those qualities, and those qualities alone, which are capable of producing scientists, statesmen, commanders, artists, poets and divines, we find that in their several branches of intellectual effort, having regard to their total number as compared with the white population, the negro race has occasionally, though rarely, produced giants of intellect. More often have they produced merchants and others capable of becoming good factors, considerably raised above the average of whites. The number of half-witted negroes is very large. The African is at least one grade below the American negro, as is the American type two grades below the Anglo-Saxon. Unquestionably the noblest race of which history holds any record, is the ancient Greek. Their masterpieces of intellectual effort are still unsurpassed and rarely equalled. In Attica alone, from 530 B.C. to 430 B.C., were produced a long list of illustrious personages, as Themistocles, Socrates, Pericles, Miltiades, Aristotle, Xenophon, Plato, and later, Demosthenes—the king of orators. When we consider the very small population of Attica, and the long list of illustrious men it produced, we can estimate the average ability of the Athenian race to have been very nearly two grades above our own, or about as much as our race is above the African negro.

By a system of partly unconscious selections (the social life of Athens being such that none but very able men could take place in it) and by discriminating in their immigration, this magnificent breed of men and women was built up; but, unfortunately, this marvellously gifted race, through lax social morality, the avoidance of marriage by the more accomplished and ambitious women, and the succession of mothers of a heterogeneous class, the high Athenian race decayed and disappeared.

You have observed that civilization with its ever-changing demands and environment has had the effect of destroying with startling rapidity the savage man. In the short space of three centuries, on the North Amercian continent,

in the West Indian Islands, in the Cape of Good Hope, in Australia, and New Zealand, human denizens of vast regions have been swept away, less by pressure of a stronger race, than through the influence of a civilization they were incapable of supporting.

HEREDITY, ITS LAWS AND CONSEQUENCES.

The laws of nature are immutable. The theory of the origin and evolution of the species as enunciated somewhat plausibly by Darwin, Huxley, et al, has this essential and fundamental difficulty to overcome, viz., that it does not conform to nature's law of immutability. Human nature, like the nature of the lower animals, has always been, is, and always will be immutable, and will continue to be a means of distinguishing one species from the other. True, there is an evolution or variation in the animal and plant life, as, for instance, when we see a child born with six fingers or six toes or some other abnormality in color, form, etc., but the nature of the animal which is the determining factor in the classification is surely constant and immutable. The law of gravitation is the same to-day as it was from the beginning. The spider to-day weaves his web with the same mathematical precision as he did in some dark corner in Rome thousands of years ago. The oyster of a thousand years ago is no more a rhinoceros now than then. No, like begets like. Thus, large men and women beget large children, and fair-haired men and women, fair children. We are all the product of forces that have gone before us. So, disease in its various manifestations, as insanity, epilepsy, feeble-mindedness, syphilis, etc., may be transmitted, and the health of our ascendents (physically, mentally and normally) influences the question as to whether we are to be born with "a sound mind in a sound body." How often have you not observed that great talents spring from a great family tree, that mental obliquity and moral degradation may be traced back as "the sins of the father" for three or four generations. The forces at work for generations before our birth should teach us to discourage those with a tainted ancestry, and who are themselves tainted, from producing their kind; for, to use the dictum of Oliver Wendell Holmes, "the treatment of some diseases should begin a hundred years before the birth of the victim."

In the eyes of the law all men are equal, regardless of the fact that of "him to whom is given of him much shall be required." All men are not born with the same power of resistance, the same amount of capital. The measure of our responsibility, therefore, is our power of resistance, our capital. We look forward to the day when the determining factor in the punishment of criminals shall be their power of resistance as well as the actual fact of the commission of the crime. Such disposition of the criminal presupposes that medical men (alienists) should be a court of justice in criminal cases.

PREVENTION AND ITS SIGNIFICANCE

The old adage that "prevention is better than cure," needs no amplification at my hands. To prevent disease is the ideal that has engrossed at all times the serious thought and earnest labor of the medical profession; men of genius and science whose silent, subtle reasonings transcend in importance the achievements of the greatest generals, the greatest statesmen, the greatest philosophers the world has ever known. The results and benefits of prevention are largely predetermined by our knowledge of causation, and who can estimate the benefits to humanity conferred by such men as Pasteur, Jenner, Koch, Virchow, Lister, and a most of others who have contributed to make preventive and scientific medicine the magnificent edifice it is to-day!

OUR DUTIES IN RELATION TO OURSELVES AND TO OUR NEIGHBOR

When we remember the transitory course of man's mortality, everything else seems vain and unimportant. Shall we live and die in the thought that all is vanity? Are we but so many chips thrown on the river of life to be carried from side to side, or perchance to linger a little while in the eddying pool, so that the business we have to do before we reach the great ocean of eternity, matters little? Perhaps, if

death were the goal of life. The great philosopher, Aristotle, upbraided nature for treating men to fewer years than some other animals, thus incidentally inferring that the creature could have done better than the Creator.

It was a memorable thought of Socrates that if all the misfortunes of mankind were pooled in one great heap in order to be equally distributed among the whole species, that those who now think themselves the most unhappy would prefer the share they now have rather than their position under such a division. Many so-called miseries and calamities are merely fanciful, begotten of lack of patience and envy at the happiness of others; but inasmuch as no man can form a complete judgment of his neighbor's suffering we must not think too lightly of another's complaints, but regard his sorrows with sentiments of humanity, and for the bona fide cases of diseases we must not only have compassion, but indicate the means of prevention and give of our time and pleasure in the treatment and cure. The ideal philosophy is to secure the happiness of the individual; not to form hard and fast judgments; not to assume cynical or stoical indifference to others; nor, to believe all sinners to be equally depraved, or all sages equally wise.

ENVIRONMENT AS AN INFLUENCE IN SOCIETY AND CIVILIZATION

Environment (as every social worker knows) embraces a full history of the community or town under consideration; as, city administration and finance, housing, milk and water supply, sewerage, community health activities, prevention and cure of disease, insanity, mental deficiency, recreation, industry, immigration, education, juvenile and adult delinquents, homeless men and women, child welfare and child labor, the organization of charity, public out-door relief, the dependent aged, etc. As you can readily understand, I can do nothing more here than merely mention these subjects, and in passing I wish to pay a tribute to the Health Department of Nova Scotia for the excellent educative and practical work it is doing—a work of great economic value to the province—the biggest asset by far, the province has.

COMMUNITY AND STATE EFFICIENCY

The consciousness that the length of life is not a foregone conclusion predicates the importance of community and state efficiency in the control of different diseases, particularly the preventable diseases. Speaking for the United States, Irving Fisher says that "a safe minimum estimate of the number of years our lives can be prolonged, is fifteen." Smallpox and diphtheria are not of such economic interest as are cholera, plague, yellow fever and especially tuberculosis and typhoid fever.

There is no good reason why typhoid fever should not be stamped out of Nova Scotia in the next decade. The typhoid bacillus has been discovered, so that the cause is absolutely known. Filth alone breeds this germ. Infection carried by impure water and milk has been the cause of a great many epidemics of typhoid. Enforced civic and personal cleanliness and vaccination are the means of stamping it out.

Another common disease, tuberculosis, can be prevented, and if taken in time, can be cured. The disease is contracted only through the tubercle-bacillus (Koch) and this germ can be destroyed; therefore tuberculosis can be eradicated from the world. It is not hereditary, but is contagious, so that, as with smallpox, diphtheria and the other contagious and infectious diseases, segregation and isolation are manifestly indicated. Of course this means more money, more hospitals, more co-operation, more enlightenment of our legislators or rather a more enlightened public opinion. I can honestly, and do cheerfully bear testimony to the fact that Nova Scotia is not behind the rest of the world in ideals of legislation and its support of humanitarian institutions. But the state has its hands full without providing for the ignorance and indifference of mothers especially, irresponsible fatherhood, bad air, food, clothing, water and milk—all of which to a large degree are responsible for most of the preventable deaths of to-day.

I am afraid I am trespassing on the time

of the Association, but I cannot close without a brief reference to the greatest upheaval in the world's history as witnessed on the far-flung fields of battle, where the greatest armies of all time are actually engaged in the most vindictive destruction of human life. The entire thought, resources and genius of nearly all the people of the world are devoted to the awful purpose of destroying their fellow man. In bold and glorious relief above the unrestricted fury of human carnage now deluging the earth with fractracidal blood, stand the hospitals, doctors and nurses in the wake of those great armies abroad, and the services at home of the unselfish devotees of the conservation of life.

Will this old world of ours, its rulers and people, ever rise to a realization that the only producer is he who makes two blades of grass grow where only one grew before, that the tiny blade needs more succor than its healthier brother, that exploitation, cruelty and autocracy are not productive factors, and must be balanced by conservation, humanitarianism and democracy?

The Sanitation of Factories

By Mr. Philip Ring
Provincial Inspector of Factories, Halifax, N.S.

Read at the Annual Meeting of the Association of Medical Health Officers of Nova Scotia, July 3, 1917.

IF I were about to address a meeting of those with whom I usually associate, it would be necessary for me to make some preliminary remarks leading up to my subject. This, of course, is unnecessary on an occasion like the present. Therefore, I will not waste any of your time with preliminaries. You will understand that I am not dealing with the subject from a professional viewpoint. My observations will be confined to the views of an ordinary layman whose duty it is to observe the sanitary conditions of factories.

The subject, "Sanitation of Factories," may be briefly summarized as follows:—General ventilation, local ventilation, toilets, drinking water, cleanliness, washing accommodation, and a few other matters to which I will refer briefly. Any one of these phases of sanitation with its many sub-divisions or side issues could be developed into a lengthy paper, consequently, you will understand that many important features of my subject must remain unnoticed.

Ventilation

The subject of ventilation in factories is, generally speaking, one of the most difficult connected with factory sanitation. While we have not in this Province the great congested centres of industry, nor the very large manufacturing establishments, that are so prominent in other places, nevertheless we have the problem of ventilation with us.

In dealing with the subject of ventilation in industrial establishments it is customary to divide it into two parts; general and local ventilation. General ventilation deals with the condition of air in a factory, while local ventilation applies to the removal at the point of origin, and before they have mixed with the air of injurious dust, gases, fumes, etc., generated during the manufacturing process.

The open window is, to a large extent, the only means of general ventilation. The cold draught from open windows very often causes the windows to be closed, thus preventing the admission of fresh air in that manner. Again, owing to the nature of some industries, windows must be kept closed on damp or wet days, as the moisture will affect the goods.

When the weather is warm enough to open doors and windows, nature may be allowed to do the ventilating, but when it becomes necessary to heat buildings, the

subject of artificial ventilation must be considered. Generally speaking, in factories the question of ventilation seems to be how to provide fresh air in workrooms, and remove the vitiated air, during the season when doors and windows must be closed. With sufficient heating facilities and the use of window ventilators this difficulty could to a reasonable extent be overcome.

It is an unfortunate fact that most employers do not give the subject of artificial ventilation the attention its importance deserves. Factories are erected without giving any consideration whatever to the matter. Eventually finding that some means must be employed to cool an overheated workroom or to remove some noxious gas or fumes, an open propeller fan is installed at a window, and the last condition is worse than the first. The dust or fumes from some machine or other process of manufacturing is drawn, often from the opposite side of the workroom, past the breathing level of the workers, with the results which will be apparent to you. Another objectionable feature of the open fan, when its installation is not properly considered, is that the large volume of air exhausted must be replaced and this replacing air will rush in through any opening such as doors, windows, elevator shafts, etc., causing such a draught that the fan must be stopped. Were the time at my disposal, I could continue to discuss this question of open fans almost for the whole time of your meeting, but it can be said that employers have wasted considerable money, and workers have to contend with unhealthful conditions, because an expert was not consulted when factories were being erected or when artificial methods of ventilation were being installed.

Heating and ventilation should be considered as inseparable if ideal conditions are to be attained. In many workrooms, in cold weather, a reasonable temperature is only obtained at the sacrifice of all ventilation. An ideal method of heating and ventilating known as the plenum system, which is intended to give a continuous supply of fresh air, is in use in a number of large industries. By this system the air is drawn through a heater by a fan, and forced through air ducts to all parts of the building. The entering air is forced into the building under pressure in a constant volume, which must displace an equal quantity of air; hence the ventilation is positive if the system is properly connected with the outside air, similar to any ordinary hot air heating system in a house. Very often we find that the fresh air inlet is omitted, one side of the inclosure about the heater is left open, and the ordinary air of the factory with its impurities, is drawn into the system and used over and over again. Thus what was intended for a heating and ventilating system is rendered useless so far as ventilation is concerned.

Local Ventilation

No industry is free from dust. As can be readily understood, it is a result or accompaniment of occupation. The importance of dust as a factor in disease and occupational mortality you will of course recognize. To remove dust or other impurities generated in the process of manufacture, the principle of local ventilation is applied; that is, an exhaust system devised specially for their removal locally at the point of origin, thus preventing them from mingling with the air in the workroom. Hoods are placed on the machines and connected by branches with a main duct, and an exhaust fan draws the material to be removed through the branches and duct and deposits it in a separator or dust chamber. As in the case of open fans, already referred to, there has been considerable disappointment in the construction of exhaust systems. Many persons think it a simple matter to design a proper dust-conveying system. In reality there are a number of points which require careful and intelligent handling. Various considerations enter into almost every case to determine the proper arrangement of the hoods and piping, so that it is impossible to lay down any hard and fast rule. Indeed, it should be stated here that the design of such a system, and the various problems arising in its installation, should be referred to those whose previous experience in such matters place them in a

position, to provide a successful and economical system.

A large number of these exhaust systems are now in use in this Province. Such a system is used to remove the fumes from the lead pot of a type-setting machine as well as the smoke and gas from a furnace. It is operating in every woodworking factory of any importance, to remove the shavings and sawdust from the machines. Grinding and polishing wheels are equipped with this system. Ropeworks and foundries are using it. In fact the system can be made useful in almost any industry.

The relation of industry to mortality has been the subject of careful and exhaustive investigation by medical experts in all industrial countries, and your own experience will no doubt agree with their conclusions that the high death rate from pulmonary diseases among industrial workers is due largely to the inhalation of dust, fumes, gases, etc., incidental to their occupations. The figures which some of those investigators give, when comparing the death rate from certain diseases between factory workers and those employed in the open air, are such as to emphasize the importance of local ventilation.

Ventilation of factories is a most important phase of sanitation and should receive the careful attention of those who are engaged in the conservation of public health. It is a fact that most workers do not notice the bad condition of air in a workroom. Even the presence of gas or some other noticeable impurity is not often detected except by a person coming in from the outside air. After all, the human element is the important factor, and improvements will not move much faster than the development of the workers' knowledge of the subject.

Toilets

Perhaps the most difficult subject the factory inspector has to deal with is the sanitary condition of closets. How to secure proper ventilation, plenty of sunlight, proper separation of the sexes, removal of closets from workrooms, and have them kept in a sanitary condition, are perplexing problems, when the situation, available space, and other circumstances peculiar to each case are taken into consideration. While we have many excellent examples of lavatory accommodation in our factories we have also many establishments where the toilets are always in an unsanitary condition. It is unnecessary for me to dwell on this latter condition, only to remind you how much it may be aggravated when it occurs in a food-producing establishment. It may be asked, why is it that those unsanitary conditions occur? It is due mostly to faulty construction and also to the filthy habits of some workers. We have not in this Province any standard requirements regulating the construction of closets. The plumbing in some localities must be inspected, but otherwise employers are at liberty to select the location and erect the closets to suit themselves, and it very often happens that even ordinary sanitary principles are neglected. If closets are erected in dark corners, they will usually be found in an unsanitary condition. Darkness seems to invite carelessness. The question of light and local ventilation is not considered, in fact it appears at times as if those essentials of sanitation were deliberately ignored. The material used in construction is not selected with a view to suitability. It cannot be expected that such places, even with care, can ever be kept in good condition.

Regarding the filthy habits of some employees, we will agree that it is a difficult problem to deal with, but it is being dealt with, and where the management has made a determined effort the trouble has been eliminated. My experience in those matters has been such that I am convinced, where closets are properly installed and given the care and attention they require, as a rule no fault can be found; where they are otherwise, it is mostly due to a lack of determined effort on the part of the employers.

If we are to make any substantial progress in this matter of toilets, we must have some standard regulations governing their erection, such as the following:

Water closets shall be readily accessible to the persons using them. The entrance to every closet which opens directly into a workroom shall be screened from view by a vestibule. No closet or

urinal compartment may be maintained in connection with rooms in which food products are manufactured or wrapped, unless such compartment is separated from such rooms by a vestibule with doors. Every toilet room shall have a window opening directly to the outdoor air. Fly screens shall be provided for toilet windows when necessary. The floors of every toilet room, and the side walls to a height of four feet, shall be constructed of material, other than wood, which is impervious to moisture and which has a smooth surface. The outside partitions of every toilet room and of every closet not located in a toilet room shall be of solid construction and shall extend to the ceiling. There are a number of other requirements embodied in standard regulations regarding the fittings, doors, partitions, etc., which deal with the moral as well as the sanitary requirements.

It will be easily understood by you that the occasional visit of a factory inspector will not be sufficient to enforce good sanitary conditions where the employers are not well disposed in that direction. It does appear that the health authorities, at least in the industrial districts, might extend their activities by occasionally visiting the industrial establishments.

Drinking Water

Most people now understand that the question of water supply for drinking purposes, and the method of supplying it, are very important phases of sanitation. There can be no doubt that the water which the employees of mills and factories drink in large quantities during warm weather has an important relation to their health and efficiency. While many manufacturers are very careful about this subject and adopt the best method to improve conditions, still it must be admitted that there are times when the drinking water in some localities is dangerous, and also that the common drinking cup is very generally used. However, the signs of improvement are encouraging. It is not uncommon now to meet workers who have their own drinking glass. Sanitary drinking fountains, are being used in a number of factories, and there is evidence that their use will increase very rapidly. You will appreciate the sanitary benefits of the bubbler drinking fountain.

Further progress could be made in this matter if our law required that pure drinking water should be supplied, and where any doubt existed that it should be submitted to laboratory examination. The use of a common drinking cup should also be forbidden.

Cleanliness

Cleanliness appears to have various and widely different meanings and it is therefore a difficult matter to deal with successfully. Nothing is so unpleasant as to have to tell an employer that his factory is dirty. The statement is humiliating to the ordinary person, and employers as a rule resent it. Nevertheless it is necessary at times to remind some employers that their workrooms must be kept clean. There are many employers who really have a high standard of cleanliness, but there are also many who altogether neglect the most elementary sanitary methods. In the latter places all kinds of dust and refuse are allowed to accumulate on the floors, walls and windows; the workrooms swarm with flies in summer, utensils are badly kept and a general lack of cleanliness pervades the whole place. I said at the outset that this was a difficult subject to handle successfully. My meaning may be readily understood when one considers the task of persuading the proprietors of such places that they should clean floors, walls and windows regularly, provide fly screens for doors and windows, lime-wash occasionally, and otherwise put into practice the ordinary principles of cleanliness. The work of keeping places where food is manufactured in good sanitary condition can hardly be accomplished by a visit from the factory inspector once or twice a year. Such places should be visited at least once a month by the local health authorities, who should have special laws and regulations regarding them.

The spirit which prompts a man to lime-wash a machine shop and that which allows another man to neglect the most ordinary care of a workroom where food is manufactured, will explain the widely

different views mentioned in the opening paragraph of this subject. Law is not necessary to the person who is naturally inclined to be clean, and I am afraid its application is of doubtful utility in the case of those who are otherwise disposed. If the public who are using the products of those establishments would investigate the source of their supplies by occasionally visiting them, a better condition of affairs would prevail, as the surest way of reaching such people is through their pockets.

At some occupations the workers perspire freely and become very dirty. How necessary and how refreshing a good wash is for this class of employees before leaving the factory! Many factories have good washing accommodations. The law should authorize the factories inspectors to order good washing facilities wherever he considers it necessary.

The pernicious habit of spitting, which is prolific of so much harm, is altogether too common in our factories. In workshops it is said to attain its highest efficiency as a destroyer of public health. Employers should be compelled to provide sanitary cuspidors in factories. The efforts of health authorities are making a noticeable improvement in this respect. A few years ago the authorities at Truro, had cards about spitting posted in all the factories in that town. Employers informed me that their workers were being educated by methods of this character, and they would welcome any other cards or literature which would teach their employees to avoid this habit. It will be evident that where an employer keeps cards of this kind posted, he must, to be consistent, keep his establishment clean.

The use of artificial humidifiers in the textile industry is usually regulated by law. We have no such regulation in this Province, and it might be well if medical practitioners would note the effect on the employees of the two large industries when this system is in operation.

It would be very much in the interest of public health if it were possible to have persons suffering from a communicable disease removed from factories. We cannot say that such persons are not among the many employees of food or clothing producing establishments.

Conclusion

In conclusion I may say that while we have many deplorable sanitary conditions in some of our industrial establishments, there are also many employers who are giving commendable care and attention to the subject. There is, moreover, a gradual improvement every year, and among both employers and workers there seems to be developing a more intelligent view of conditions. We will continue to be handicapped in the enforcement of good sanitary conditions in factories until we have standard requirements or regulations governing many of the matters referred to. In dealing with the subject of ventilation, the English factory laws require that there shall not be more than 10 or 12 parts of carbonic acid gas present in 10,000 volumes of air. The inspectors are provided with apparatus for taking samples of air, and if the amount of carbonic acid gas in the sample taken exceeds this proportion, the employer is notified that he must improve the ventilation. Different factory laws make provisions for the removal of dust, gases, etc., by exhaust systems, and specify a test by which the efficiency of a system can be determined. Some laws deal with the subject of light, and prescribe a certain window space per area of workroom, and also prohibit the use of any but plain glass in factory windows. The question of temperature, humidity, washing accommodations, drinking water, cleaning of walls and ceilings, and many other sanitary matters are usually subjects of standard regulations. The tendency of modern factory legislation is to remove all doubt or argument by specifying, where possible, just what is required. We will agree that there is such a thing as having too much law, but we can always use common sense, and after all reasonable means have been exhausted the law is a very useful lever.

We are living in an age when it is admitted that the best index of a company's prosperity is the condition of its workers. Consequently, anything that makes for a higher standard of health, cleanliness or morality among the people is to be com-

mended, and should be encouraged. If we are to retain our sturdy and courageous manhood, then we must see that the conditions under which men labor shall not make them unfit to meet an emergency.

The great orator, Macauley, speaking in the British House of Commons in 1846, on the subject of factory employees, said: "Where health is concerned, and where morality is concerned, the state is justified in interfering with the contracts of individuals." And he further stated: "Never will I believe that what makes a population stronger, and healthier, and wiser, and better, can ultimately make it poorer. If ever we are forced to yield the foremost place among nations, we shall yield it to some people pre-eminently vigorous in body and mind."

Community Health of Cities in Middle and Western Pennsylvania

DURING the weeks of March 12, and March 19, 1917, the Metropolitan Life Insurance Company, with the co-operation of the health and philanthropic agencies in the cities of Middle and Western Pennsylvania, conducted a health census among its policyholders and among the general population of those cities. The inquiry was made through the company's agency staff. The health status of a little more than 328,000 persons was ascertained, among whom were found 5,789 cases of sickness. In some of the cities the survey reached over 20 per cent. of the total population. It is especially important to know that this representative portion of the population in the cities surveyed, included a large number of men, women and children of the wage-earning classes. The findings of the census may be conservatively held to represent health conditions among the population, and especially the working classes, of the mining, and iron, and steel regions, in Pennsylvania.

For all the cities combined, the sickness rate was 18 per 1,000. The following table shows the principal facts of sickness among the occupational groups represented in the survey:

TABLE I

Sick persons per 1,000 exposed. Principal groups of population surveyed in leading cities of Middle and Western Pennsylvania.

Group of population surveyed—	No. of persons enumerated.	Rate of sickness per 1,000.
All groups in state	328,051	18
Bituminous coal mining employees	5,428	23
Other persons in bituminous coal mining families	17,439	15
Anthracite coal mining employees	16,230	26
Other persons in anthracite coal mining families	43,721	16
Other persons in state	245,233	17

The number of cases of sickness per 1,000 persons was greatest among anthracite coal mining employees; the next highest sickness rate was found among bituminous coal mining employees. Members of anthracite coal mining families, other than the miners themselves, showed a rate of 16 per 1,000, which was slightly higher than the sickness rate among members of bituminous coal mining families, other than the miners themselves. Among other persons in the state not employed in mining occupations or who were not members of mining families, the sickness rate was 17 per 1,000. A further development of these sickness statistics according to the precise diseases and conditions observed in the several occupation groups, will be published in the final report of the health census of Western and Middle Pennsylvania.

The sickness rate was higher among colored than among white persons. In the group of cities as a whole, 21 colored persons were sick for each 1,000 enumerated; the corresponding rate for white persons was 17 per 1,000.

The districts of Pittsburgh, Braddock and Pottsville, showed the lowest sickness rates for the survey, 16 per 1,000 canvassed. The New Kensington and Hazelton districts showed a sickness rate of 17 per 1,000. Wilkes-Barre district had a rate of 18 per 1,000; Johnstown and Shenandoah, 19 per 1,000; Connelsville, 20 per 1,000; McKeesport, Altoona, Scranton, and Shamokin, a rate of 21 per 1,000. The highest rate for any section in the state was shown for Uniontown, and the immediate vicinity, where the rate was 23 per 1,000. These facts are developed in the following table:

TABLE II.

Sick persons per 1,000 exposed. Principal districts of Western and Middle Pennsylvania. March 12 to 24, 1917.

Area. *Districts surveyed	Rate per 1,000 exposed. Total	White	Colored
Pennsylvania (total)	18	17	21
Pittsburgh	16	16	18
Braddock	16	16	23
McKeesport	21	20	24
Pottsville	16	16	**
Uniontown	23	22	28
Connellsville	20	19	23
Johnstown	19	18	39
Altoona	21	22	**
Scranton	21	21	**
Shamokin	21	21	**
Wilkes-Barre	18	18	**
New Kensington	17	16	**
Hazelton	17	17	**
Shenandoah	19	19	**

*These districts include the towns and villages immediately adjoining the city specified.

**Insufficient data.

Taking the group of cities in Pennsylvania as a whole, the chief causes of disability registered in the survey were accident and injuries, which accounted for 11 per cent. of the total; rheumatism was next in importance, with 8 per cent. of the total, and influenza, with 7 per cent. of the total cases of sickness registered. Pneumonia was registered in 6 per cent. and tuberculosis in 3 per cent. of the cases. Diseases of the stomach, asthma, diseases of the heart, "colds," and bronchitis, each accounted also for about 3 per cent. of the cases of sickness.

On the basis of the sickness rate shown, about seven days per inhabitant of working age, are lost each year on account of sickness.

Cancer Mortality Among Wage Earners Decreasing

Insurance Company Issues Cancer Statistics on 9,000,000 Policy-holders

THE larger life insurance companies are closely observing their mortality experience from cancer. This they have done because of the great public interest in this disease, and more especially because the figures published by the U. S. Census Bureau have indicated an increase in the cancer mortality rate. The results of an investigation of cancer mortality of insured wage earners show, however, that in 1916 an actual decrease in the rate occurred. In the Metropolitan Life Insurance Company, Industrial Department, 6,389 deaths from cancer were registered in 1916, and the rate per hundred thousand living, was 70.8.* In the year 1915, the rate was 72.1, which represents a fall of nearly 2 per cent. in the rate in one year. The decrease in the rate in 1916, over 1915, was greater than that registered for any previous year.

It is of great interest to observe that the cancer death rate when considered by organ or part affected, does not show the same rate of decrease as that referred to above. The rate for cancer of the stomach and liver increased slightly. On the other hand, the more accessible forms of cancer, such as those affecting the peritoneum, intestines and rectum, showed a slight decrease, and cancers of the female genital organs, which are quite accessible and readily diagnosed, showed a very marked decrease, from 14.3 to 13.0 per hundred thousand. Cancer of the breast, also an accessible form of the disease, showed a decrease in the mortality rate between the two years studied. Taken altogether, the record for 1916 is decidedly encouraging. The following table shows the rates for the two years 1915 and 1916 respectively, by organ or part affected:

Tendency of Cancer Mortality among Nine Million Wage Industrial Insurance Policyholders.

	1915		1916		decline in
Form of Cancer	Deaths	Rate per 100,000	Deaths	Rate per 100,000	1916
Cancer—all forms.	6,389	70.8	6,129	72.1	1.8
Cancer of the stomach and liver	2,505	27.8	2,307	27.1	2.6*
Cancer of the peritoneum, intestines, rectum ..	804	8.9	773	9.1	2.2
Cancer of the female genital organs	1,177	13.0	1,212	14.3	9.1
Cancer of the breast	587	6.5	587	6.9	5.8
All other cancers..	1,316	14.6	1,250	14.7	.7

*Increase.

The cancer rate among white lives (70.8 per 100,000) was higher than among colored lives (61.8 per 100,000).

A GREAT PUBLIC HEALTH PROBLEM

There is perhaps no public health problem more important or one more difficult of solution than that of the control of venereal disease. Unlike other infections syphilis and gonorrhea are, in the public mind, inseparable from sexual immorality, and, therefore, up to a very recent date, regarded as wholly unsuitable for discussion except at medical meetings and in scientific journals.

Happily for the human race this attitude of aloofness is now fast disappearing, largely as the result of public health education conducted by a number of social hygiene organizations, and a few city and state departments of health.

Thinking persons are awakening to the fact that these two diseases, world-wide in distribution, are daily causing so much domestic sorrow, illness, and so many deaths, that the prudish plea of indelicacy can no longer be tolerated as an excuse for failure to take action against their ever-increasing spread. The ignorance of the public of the ravages of these diseases, familiar to every physician of experience, is astonishing. How many people know that, excluding appendicitis, the great majority of abdominal operations performed on young married women are due to gonococcal infection, contracted as the result of ignorance on the part of the husband regarding his own health before marriage? How many boys and young men have any real knowledge of the dangers to health and life which result from an attack of venereal disease? How many of them know that the question of full recovery from such diseases can only be determined by the most painstaking examination by a skilled physician and by laboratory tests? How many know that asylums for lunatics and imbeciles are largely filled by the victims of syphilis, or that childless marriages, stillbirths and miscarriages are most frequently caused by one of these diseases? How many victims of their own fears and credulity know that every advertising specialist in "diseases of men" has proven on investigation to be the meanest type of fraud, whose advice is worse than useless, and given with the sole aim to extract the last obtainable penny from the unfortunates who fall into his clutches?

The Commissioner of Health has caused to be introduced into the Legislature an amendment to the Domestic Relations Law, which makes it incumbent upon every man and woman applying for a marriage license, each to make a statement in the following words: "I have not to my knowledge been infected with any venereal disease, or if I have been so infected within five years, I have had a laboratory test within that period which shows that I am now free from infection from any such disease."

It is hoped that this amendment will be favorably acted upon during the present session of the Legislature. As a means of arousing public interest in a matter of vital importance to the people of the state its value cannot be overestimated, even though the provisions of the law should prove to be frequently evaded.

With the introduction of this new law and the amendments to the Sanitary Code, elsewhere set forth, the State Department of Health inaugurates an educational campaign against the spread of these diseases, to the end that the people of the State of New York shall have full knowledge of well established facts, and so order their lives and the lives of their girls and boys that the victims of ignorance may be reduced to a minimum.

The moral factors involved in this campaign must be left to other agencies, whose co-operation the Department of Health gladly welcomes, while adhering strictly to its proper function of suppressing disease, regardless of its origin. —Health News, May, 1917.

"What is an anecdote, Johnny?" asked the teacher.

"A short, funny tale," answered the little fellow.

"That's right," said the teacher.

"Now, Johnny, you may write a sentence on the blackboard containing the word."

Johnny hesitated a moment and then wrote this: "A rabbit has four legs and one anecdote."

Sixth Annual Congress of Canadian Public Health Association

The Sixth Annual Congress of the Canadian Public Health Association was held in Ottawa on September 27th and 28th, last. The attendance was very representative, members were present from every province of the Dominion. The program was arranged to include a symposium on or discussion of four main topics. The first morning session was devoted to a discussion of venereal disease problems. Most interesting papers were read by Captain Gordon Bates, of Toronto; by Major Lauterman, of Montreal, for Lt.-Col. F. S. Patch, of Montreal, and by Dr. Hector Palardy, of Hull, Que. The discussion was opened by Captain H. W. Hill, of London.

At the first afternoon's meeting, the presidential address of Dr. J. D. Page, of Quebec, was read. It was a comprehensive and forceful presentation of many aspects of the immigration question. Following this, a symposium on "Nation Health Insurance," was held. Those participating were: Mr. Miles M. Dawson and Dr. I. M. Rubinow, of New York, and Dr. C. J. Hastings, of Toronto. The discussion was opened by Dr. John P. Morton, of Hamilton. This was a most interesting session, and really opens the educational campaign on Sickness Insurance, etc., in Canada. It is a matter of interest that these two sessions are the first ever held in Canada devoted to the discussion of these topics. The papers will appear in The Public Health Journal.

The morning session of the second day of the meeting was devoted largely to Child Welfare and Housing. Dr. Alan Brown and Miss Mary Power, of Toronto, and Mrs. J. A. Henderson, of Montreal, made important contributions to the first subject.

Mrs. A. M. Huestis and Mr. F. A. Dallyn presented papers on "Housing." The paper of Mr. Dallyn was illustrated by excellent lantern slides. Both of these speakers dealt in an adequate manner with this extremely important subject in its relation to civic betterment. Dr. J. A. Baudouin, of Lachine, read a paper on the milk question. Papers were also read by Dr. F. C. Middleton, of Regina, for Dr. M. M. Seymour, on "Vital Statistics," by Dr. W. H. Hattie, of Halifax, on "Some Medico-Sociological Problems Arising Out of the War," "Reducing Quarantine Periods," and "The Provision of Custodial care of Recalcitrant Open Tuberculosis Cases," by Captain H. W. Hill, of London. Dr. Helen MacMurchy, of Toronto, read a paper on "The Influence of Mental Defectives on the Public Health."

A meeting of the Laboratory Section was held on the afternoon of September 28, papers by Col. G. G. Nasmith, Toronto; Professor A. Vallee, Quebec; Captain R. D. Defries, and Dr. H. K. Detweiler, of Toronto, were presented, and Mr. Joseph Race, of Ottawa, brought forward the provisional draft of the report of the Committee on Standard Methods of Water Analysis. The Laboratory Section was well attended. Hamilton was chosen as the place of meeting for 1918, and joint sessions will probably be held with the Ontario Health Officers' Association in that city during the last week in May, 1918. The following officers were elected:

Patron—His Excellency, The Governor General.

Honorary President—Sir John Gibson, Hamilton.

President—Dr. W. H. Hattie, Halifax.

Vice-Presidents—Dr. J. A. Hutchinson, Westmount; Mrs. A. M. Huestis, Toronto; Dr. George Clinton, Belleville.

General Secretary—Major J. G. Fitzgerald, Toronto.

Treasurer—Captain George D. Porter, Toronto.

Editorial

A FEDERAL DEPARTMENT OF PUBLIC HEALTH

Canada needs and should have at once, a Federal Department of Public Health. No other need is so urgent and so likely to be supplementary and complementary to the country's military activities. The fulfillment of this national requirement will aid materially not only in winning the war but will most certainly be a tower of strength in the period of reconstruction. The Public Health Journal pledges itself in this issue to a vigorous prosecution of this aim by every legitimate means. Our readers are asked to join us in this campaign, and to the end that the best possible plan be evolved and all aspects of the question considered, letters are earnestly requested dealing with any phase of the organization of this department.

THE PHYSICIAN'S OPPORTUNITY

In these troublous times when the physician is playing such a useful part in conserving the health of the army, one cannot but be impressed with the opportunities which are ready to his hand in civilian life.

The day of the physician who cares more for his social position than the community he lives in, is gone. Mystery, superstition, false dignity, are fast losing the sway which not so many years ago they held with the average physician, and are being replaced by the sincerity and usefulness which must come from scientific knowledge of the actual facts of disease.

Obviously the rapid development of bacteriology and various accurate methods of diagnosis has meant that the physician has actually come in touch with the causes and results of disease. The causes are so well defined and the results so serious to the general welfare, efficiency and happiness of the average human being, that social changes of the most far-reaching significance may well ensue.

Not only to win the war, but to win anything worth while from a community standpoint, a mobilization of the wealth of our country is essential—and the country's greatest wealth is its men and women. It is logical then to ask immediately how many specimens of these our greatest wealth, are efficient, how many, so to speak, are on the scrap heap. To make diligent enquiry as to why thousands of our fellow citizens occupy insane asylums and hospitals unnecessarily is mere common sense. To be deeply concerned with the problems of venereal diseases, tuberculosis, and infant mortality, is a plain public duty.

Such are the questions in which the public-spirited physician will find his opportunity. His scientific knowledge of the facts of the case must be his gift to the public. Given a broad viewpoint and an adequate conception of the possibilities before him, he will go far. For public leadership and constructive statesmanship his opportunity is magnificent and unexcelled.

VENEREAL DISEASES

The frankness with which Toronto newspapers have been discussing the venereal disease question in their editorial columns of late, is a source of gratification to all workers for the public health. The "conspiracy of silence" in regard to gonorrhea and syphilis, has indeed been a conspiracy of the most dangerous character. It was founded on an ignorance of the facts. Its natural sequence was an attitude of careless indifference on the part of the public to a terrible social scourge and absolute apathy so far as preventive effort was concerned. Knowledge in this case is indeed power and action will surely follow the well-timed recent publicity. The newspapers which have lead in what has really been a magnificent campaign of public education, are to be congratulated on their action.